

SPRINKLER IRRIGATION SYSTEM DESIGN

NAME DATE PREPARED BY

SWCD COUNTY ENGR. JOB CLASS

INVENTORY

Total Acres Crop Acres Climatic Area

Water Source Amt. Available gpm, acre ft Seasonal variation gpm to gpm

Power Source, Electric volts, phase. Internal combustion engine Fuel type Other

SOILS DATA

USDA limiting soil series	Total Available WHC (in/ft)					Depth to		Maximum intake rate (in/hr)
	0-1	1-2	2-3	3-4	4-5	Inhibiting layer (ft)	Water table (ft)	

WEIGHTED CONSUMPTIVE USE

Crops	Acres (A)	June	July	August

IRRIGATION REQUIREMENTS

Crops	Root Zone Depth (ft)	Total AWHC (inches)	Stress Point (%AWHC)	Max. Net Replacement (inches)	Peak Daily C.U.	Max. Freq. at Peak C.U. at Max. Net

DESIGN DATA

Based on weighted consumptive use, % Eff., MPH winds, Wind Factor

	Application		Peak Daily C.U. * (Weighted)	Frequency (F) (Days)	System Requirements	
	Net (D)	Gross			(Total gpm) (Q)	gpm/ac.
Maximum						

$$Q = \frac{453 A D}{F H \text{ Eff.}} \text{ system capacity}$$

H = Total operating hours/day. Use 23 hours.

* Use controlling weighted monthly consumptive use from Table 8 in Oregon Irrigation Guide and determine daily consumptive use from Table 5, NRCS Technical Release 21, Irrigation Water Requirements.

SPRINKLER SYSTEM DESIGN

Nozzle Spacing(S_L), Lateral Spacing on Mainline(S_m), Min. wetted dia.= $\frac{(S_m)}{(\text{wind factor})} = \dots\dots\dots$ ft.

Sprinkler Head, make Model nozzle size GPM PSI wetted dia.

Application ratein/hr, Applic. time hrs/set. Net Applic.=(rate, in/hr) X(eff) X(hrs/set)= in.

Max. Irr. Cycle= $\frac{(\text{Net Applic.})}{(\text{Peak Daily C.U.})} = \dots\dots\dots$ days. Min. No. Laterals= $\frac{(\text{No. Lateral Sets})}{(\text{Max. Irr. Cycle}) (\text{Moves/day})} = \dots\dots\dots$

Designed Laterals: No., Dia., Type, Moves/day Sys: Cap.= (no. of nozz.) X (gpm/nozz.)=gpm.

LATERAL DESIGN

Allowable Friction Loss = $0.2 \times (\text{nozz. psi} \pm \frac{\text{elev.}'}{2.31}) = \dots\dots\dots$ psi. Actual Friction Loss (worst condition) psi.

Pressure require at the Mainline: $P = (\text{nozz. psi}) + 3/4 \times (\text{lat. fric. psi} \pm \frac{\text{elev.}'}{2.31}) = \dots\dots\dots$ psi.

MAINLINE DESIGN

Mainline: material, psi rating, other description, PIP, IPS, SDR, GATE, CLASS, etc.

Friction factor used..... Mannings "n" factors: plastic under 6" = 0.010, over 6" = 0.009, steel = 0.012, asb. cem. = 0.01

Desirable mainline velocities are 5 fps or less (required on PVC and AC pipe).

Station		Diameter of Pipe	Flow (gpm)	Velocity (fps)	Distance	Friction Loss per 1000'	Friction Loss this Section (ft)	Accum. Friction Loss	Remarks
From	To								

DETERMINATION OF TOTAL DYNAMIC HEAD

Pressure required at Main psi ft

Friction loss in Main psi ft

Elevation rise/fall psi ft

Lift (water surface to pump) psi ft

Column Loss psi ft

Miscellaneous Loss psi ft

Total (TDH) psi TDH must be in feet for horsepower equation

HORSEPOWER REQUIREMENTS

$$\text{BHP} = \frac{(\text{TDH} \dots\dots) \times (\text{GPM} \dots\dots)}{3960 \times (\text{Pump Eff.} \dots\dots)} = \dots\dots \text{HP}$$

Pump curve data attached. yes () no () If not supplied, NRCS will assume 70% efficiency.

Bill of material attached. yes () no ()

HORSEPOWER REQUIREMENTS

	Needed	Not Needed	Location	Size	Construction Check. Installed
Expansion Couplers					
Reducers					
Anchors					
Thrustblocks					
Bends					
Tees					
Outlets					
Surge Chamber					
Drain Valves					
Check Valves					
Pressure Relief Valves					
Air-Vacuum Release Valves					
Pipe Supports					
Corrosion Protection					
Other:					

Attach any special drawing

COMMENTS:

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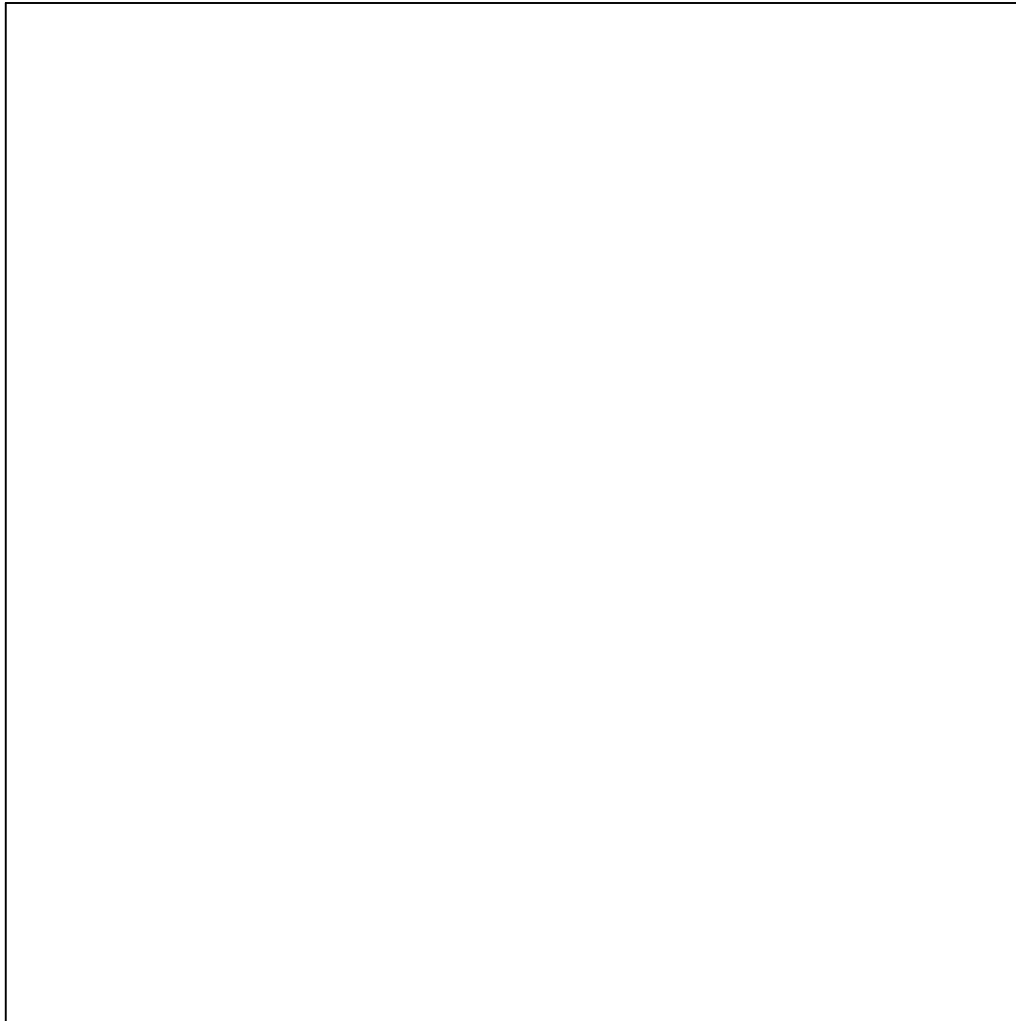
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LOCATION AND LAYOUT MAP



Show:

Location of acres not sprinkled.

Direction of prevailing wind.

Elevations (contour preferable).

Stations on mainline in feet or
alphabetical notation.

Pump location. ☒

Mainline location — — — — —

Lateral layout

W = wheel line

H = hand move

S = solid set

Direction of lateral move.

North Arrow

Location of nearest section
corner.

Scale

Township

Range

Section

SYSTEM DESIGNED BY: (Organization) (Signature) (Date)

(NRCS ONLY) Reviewed by: Date

Approved by: Date

REMARKS

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